**Arsenic exposure and the microbiome**

Metabolomic Analysis: NIH Eastern Regional Comprehensive Metabolomics Resource Core (RTI RCMRC)

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IRB Number(s): #20844

**Abstract:**

Exposure to arsenic (As) during the vulnerable window of fetal development and early childhood has shown significant clinical effects. In highly exposed populations, altered immunity is one of the most affected pathways and can lead to an elevated risk of infection and a pre-disposition to allergy/atopy. Since well water in the New Hampshire region has been determined to be a potential source of As exposure, this study includes mother-infant dyads living in the area, who obtain household water from private wells. This study seeks to determine if in utero and early life As exposure is related to increase occurrence of childhood: infections, allergy and atopy, and diminished vaccine response. It has been observed that the microbiome is an important mediator of immune impairment due to As exposure. Therefore, we will further investigate the relation between *in utero* and early life As exposure on the development of the infant intestinal microbiome in the first year of life. For this study fecal samples, from infants at risk of As exposure, were collected at 6 weeks and 12 months of age. Metabolomics data will allow for a more complete picture of the relationships between the microbiome, As exposure and immune function.

**Sample Description:**

Fecal samples were collected from 6 week and 1 year olds, living in New Hampshire, who obtain household water from private wells. A mass of each de-identified feces sample was shipped to the NIH RTI-RCMRC on dry ice and immediately stored at -80 °C after being logged in for metabolomics analysis.

The data obtained for the NMR metabolomics analysis can be found in the accompanying files:

Procedures: 1. Dartmouth As Exposure NMR Procedures.docx

Study Design Tables: 2. Dartmouth As Exposure NMR Study Design Table.xls

Metadata: 3. Dartmouth As Exposure METADATA.xlsm

Processed Data: 4. Dartmouth As Exposure NMR Normalized Binned Data.xlsx

Raw Data: 5. Dartmouth As Exposure NMR Raw Data.zip

**Notes:**

Full sample preparation and analysis procedures are available in the accompanying document entitled **1. Dartmouth As Exposure NMR Procedures.**

Descriptions of abbreviations for factors are available in the Variable Dictionary in the accompanying file no. **2. . Dartmouth As Exposure NMR Study Design Table.xls**.

The phenotypic and normalized data are available in the accompanying files: **4. Dartmouth As Exposure NMR Normalized Binned Data.xlsx** for normalized binned NMR data. Sample ID and factors can be found in the first 5 columns and other columns in the spreadsheet contain sample metadata and the normalized binned data. If the statistical program does not allow variable names to begin with a number then add a prefix to the column names, for example, bin\_8.98 instead of 8.98.

The Sample ID serves as the unique identifier (DRCC ID) of the individual samples and is used as the NMR folder name in the raw NMR data file **5. Dartmouth As Exposure NMR Raw Data.zip**.